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## Ergonomic Analysis of Veterinary Surgical Tasks

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### ABSTRACT

Studies have observed injuries and musculoskeletal discomforts among surgeons in human medicine. It is likely that veterinary surgeons endure similar discomfort; however, limited work has been done in this domain. Therefore, this research aims to identify occupational risk factors affecting the upper extremities of leading and assisting surgeons in orthopedic and soft tissue small animal surgeries. As a result, we aim to reduce surgeon injuries by assessing the surgical environment in veterinary care. To collect objective metrics, inertial measurement units (IMUs), heart rate monitors, and Electromyography (EMG) sensors are used. In addition, surveys are used to evaluate perceived pain before and after surgery and the workload of the task. In total, 5 participants were studied over 26 surgeries. Postoperatively, neck discomfort was most commonly recorded. Neck discomfort was reported in two-thirds of the cases by of the orthopedic surgeons and over one-third of the soft tissue surgeries. Average perceived workload was reported higher in orthopedic surgeries compared to soft tissue surgeries. When measuring the deltoid and trapezius muscle activities, orthopedic surgeons exerted about 21% of their maximum muscle force across the two muscle groups and soft tissue surgeons exerted 12%. These results provide insight to surgeons' perceived workload and physical efforts associated with performing surgery, and further applications of this work may translate to modifications to surgical environments or additional surgeon education to reduce physical strains.

### KEYWORDS

Veterinary medicine, surgery, occupational risk, ergonomics